GENETIC RESISTANCE OF PEANUTS TO THE TOBACCO THRIPS, *FRANKLINIELLA FUSCA*, AND THE RED-NECKED PEANUTWORM, *STEGASTA BOSQUEELLA*

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Bachelor of Science

Oklahoma State University

Stillwater, Oklahoma

1968

Submitted to the faculty of the Graduate College
of the Oklahoma State University
in partial fulfillment of the requirements
for the degree of
MASTER OF SCIENCE
May 1970

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ACKNOWLEDGEMENTS

Deep appreciation is expressed to Dr. R. R. Walton, my major advisor, for his guidance throughout this research and for his support in preparation of this manuscript.

I want to thank my committee members, Drs. Jerry H. Young and R. D. Eikenbary, for thier advice and constructive criticism of this manuscript. Sincere appreciation is extended to Bill Lingren, student in Entomology, for his help in gathering data for this thesis.

I wish to thank Dr. Matlock for arranging the planting and cultivation of the peanuts in the field plots.

Indebtedness for the financial support for this work is expressed to the Oklahoma State Experiment Station and to the United States Department of Agriculture, Agricultural Research Service, through Grant No. 12-14-100-8046(33).

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INTRODUCTION

The tobacco thrips, <u>Frankliniella fusca</u> (Hinds), is a pest on peanut plants in all growing areas of the United States. Immature thrips rasp the epidermis of young foliar buds resulting in scarred and malformed leaflets. Thrips feed on peanut flowers also, but the major damage is the loss of photosynthetic area on the leaflets. It is not clear at the present time to what extent thrips damage directly reduces the fruit or hay. However, it is probable that thrips damage retards development, delays maturation; and decreases vigor, making the plants more vulnerable to disease and other hazards.

The red-necked peanutworm, <u>Stegasta bosqueella</u> (Chambers), is a pest on peanuts in some of the growing areas in the United States. The larvae feed on the young foliar buds thus causing defoliation and loss of photosynthetic area. It is stated that peanutworm damage in conjunction with other pests or disease can cause a reduction in fruit and hay yield.

Both of these pests can be controlled with insecticides, but because of the relatively short period of protection obtained and growing concern about the use of toxic chemicals, an alternate method of crop protection is desired. One such method is the use of plant strains which have genetic resistance against an insect pest species. Genetic resistance is a heritable capacity to escape or to withstand insect damage to a greater degree than other strains of the same species. It is an ideal method of crop protection because it is inexpensive, requires little time and effort, and is relatively permanent.

The first step in the development of a resistant strain is to locate germ plasm with such resistance. After the strain is recognized, the mechanism should be isolated to facilitate the production of a high yield insect resistant strain.

The purpose of this study was to screen peanuts for tobacco thrips and red-necked peanutworm resistance to identify the resistant germ plasm to each pest.

This investigation was conducted in 14 field tests during the period June 1 to September 16, 1968. Results revealed several entries were less damaged than the commercial variety, Starr, by each of these pests.

REVIEW OF LITERATURE

Resistance to Thrips

Apparently the first report of thrips damage to peanuts was by the Florida Agricultural Experiment Station in 1922 (Watson 1922). The damage was recognized by farmers who called it "possum ear" in reference to the shape of the damaged leaves (Wilson and Arant 1949), and more commonly, "pouts" because the young plants would not grow until they began to bloom (Poos 1941).

In experiments with thrips caged on peanuts, Shear and Miller (1941) reported that thrips were responsible for the injury previously termed "pouts". The term "thrips damage" was adopted for the sake of accuracy.

The dominant species of thrips collected from injured peanuts was identified as *Frankliniella fusca* (Hinds) in Georgia, Virginia, North Carolina, Texas, Alabama, and Oklahoma (Poos et al. 1947, Harding 1959, Eden and Brodgen 1960, Young 1969). The source of thrips infestations is from weeds and volunteer plants that are attractive to adult female thrips that emerge in early spring and begin reproducing. Their progeny migrate to peanuts soon after seedling emergence (Arant 1951, Poos et al. 1947, Eddy and Livingston 1931).

Thrips eggs are inserted into the tissue of leaf buds with hatching of larvae in 4 to 7 days. They feed on the folded leaves within the buds by rasping the epidermis and sucking the exuding sap. The gravid period extends throughout the adult life but drops markedly after the first 12 days (Eddy and Livingston 1931, Kinzer 1968), with the adult life averaging thirty-four days. The larvae are thigmotrophic and tend to feed on the inside of a folded leaflet; thus, the damage occurs on the upper surface of opened leaflets (Poos 1945).

Thrips damage varies in severity each year, but is most severe on young seedlings and young plants until blooming starts (Eden and Brodgen 1960, Poos 1945). Plants are often stunted and occasionally may be killed. Workers report that thrips often cause stunting of growth but disagree as to the effect on crop yield. Leuck et al. (1967) and Poos et al. (1947) reported the yield of total green weight increased from 36% to 45% when thrips were controlled with an insecticide. By using systemic insecticides, Hyche and Mount (1958) reported pod yield increases from 240 to 617 lb/acre. A healthier plant was obtained when thrips were controlled in experiments by Poos and Dobbins (1951) and by Wilson and Arant (1949). No significant increase in yield from thrips control was indicated in the following publications: Arant 1954, 1950; Arthur and Arant 1954; King et al. 1961; and Harding 1959.

Apparently there are many variables which influence thrips damage. Under natural conditions, with no insecticides, the soil fertility, rainfall, and population level affect the amount of thrips damage and the extent to which a plant can recover and yield normally (Arant 1951, Poos et al. 1947). Leuck et al. (1967) suggested that the variety of peanut, and its reaction with thrips may affect the population level, damage, and yield. In field and laboratory genetic resistance tests, Young (1969) reported significant thrips damage differences among 872 peanut accessions tested at the Oklahoma Agricultural Experiment station.

Control of insect pests by the use of insect resistant crops was known as early as 1792 and over 100 different crops were reported to have insect resistant varieties by 1931 (Snelling 1941). An insect resistant crop provides the ideal method of control since it requires little expense and effort once it is developed (Packard and Martin 1952). It is usually specific to one species of insect and relatively permanent and does not involve chemical contamination hazards that may occur in insecticidal treatment (Painter 1951).

Snelling (1941) referred to resistance as "those characteristics which enable a plant to avoid, tolerate, or recover from attacks of insects under conditions that would cause greater injury to other plants of the same species." Painter (1951) defined it as "the relative amount of heritable qualities possessed by the plant which influence the ultimate degree of damage done by insects." Beck (1965) used it as "the collective heritable characteristics by which a plant species, race, . . . may reduce the probability of successful utilization of the plant as a host by an insect species . . ." Painter (1958) stated, "plants that are inherently less damaged or less infested than others under comparable environmental conditions in the field have been called resistant". This is the definition that is used in this thesis.

Painter (1951) classified plant-insect relationships into three basic categories: non-preference, antibiosis, and tolerance. Preference or non-preference is used to denote the group of plant characteristics and insect responses that lead to or away from the use of a particular plant or variety for oviposition, food or shelter, or for combinations of uses. Antibiosis includes those factors in a plant that unfavorably affect the development or survival of insects feeding on the plant. Tolerance is the basis of resistance by which the plant repairs injury to a marked degree, grows and reproduces itself, while supporting a population approximately equal to that damaging a susceptible host.

Insect resistance in plants may be evaluated by measuring or rating the amount of damage produced, by counting the number of insects present, and by determining the survival or development rate of the insects (Young 1969).

Kinzer (1968), Young (1969), and Sung (1969) made counts of the number of insects present on different varieties tested in the laboratory by placing infested plants in 1-gal. Berlese funnels. This method was reported as the best way, because of the small size and behavior of the thrips, to obtain comparative population counts.

A measurement of thrips damage among peanut varieties was conducted by Leuck et al. (1967). They estimated the percentage of leaves showing thrips damage. They found Starr, Argentine, and NC-2 to be less preferred in a two-year test on fourteen peanut lines.

Matlock (1966) scanned plots containing approximately 40 peanut plants and rated them on a 10-point scale for thrips damage.

Young (1969) evaluated differences in thrips damage to 872 peanut accessions with a 1 to 8-point scale. "One" indicated no damage and "eight" represented complete dying of the leaf. This method of rating was used for the evaluation of thrips damage reported in this thesis.

Young (1969) found significant differences among entries in each experiment and P.I. 268661 and P.I. 280688 appeared to be the most resistant, with the latter being non-preferred by thrips in laboratory tests. The Argentine variety indicated antibiosis. P.I. 155053 and P.I. 268633 were among those that were consistently susceptible in field tests.

In a preliminary study of inheritance of resistance to thrips in peanuts Sung (1969) crossed P.I. 290597 (Okla. P-947), moderately resistant, and P.I. 268663 (Okla. P-844), susceptible to thrips. Since the F_1 and F_2 generations tended to be more tolerant to thrips feeding than the parental average, dominance for tolerance over non-tolerance may be indicated.

Red-Necked Peanutworm

The red-necked peanutworm, Stegasta bosqueela, was collected in Kansas and Texas in 1903 and recorded in the United States National Museum (Busk 1903). Bissell (1942) reported the collection of the red-necked peanutworm on peanuts. Although Bissell found no significant damage by this insect, it was reported to be a severe pest of peanuts in Brazil (Bondar 1928). The pest was reported in Oklahoma and Alabama in 1957 on peanuts at 100% infestation of terminals during the peak infestation period (Arthur et al. 1959, Walton and Matlock 1959).

At least four generations of the peanutworm develop per year on peanuts in Oklahoma. Seasonal population peaks occur from late July to early September. Infestations may occur on alfalfa and partridge pea prior to the emergence of peanut plants (Manley 1961).

The eggs are small, white to pale yellow, and are deposited singly within the closed buds of the developing terminal shoots. The incubation time is approximately three days (Manley 1961).

The larvae develop through five instars in approximately 15 days, and are about one-third inch long in the fifth instar. They are light green to yellow with the late second, third, fourth, and fifth instars possessing a red color on the pro- and mesothorax behind the brown head (Heinrich 1921, King et al. 1961).

The larvae tunnel the ends of the shoots and feed on the unfolded leaflets, causing malformation of the leaves when they become fully developed. They are also reported to feed possibly on pegs and nuts (Walton and Matlock 1959).

The adults are reported to have lived a maximum of 16 days in the laboratory and overwintering has occurred in the pupal stage in the soil (Manley 1961).

Arthur et al. (1959) reported excellent control of the red-necked peanutworm with application of several insecticides. In their limited number of experiments, yields of peanuts were taken and no significant increase in yield resulted with thrips control.

Chemical control of the red-necked peanutworm is of doubtful value in Texas, since applications of insecticides for the corn earworm on peanuts controlled the peanutworm with no apparent increase in yield (King et al. 1961).

Walton and Matlock (1959) found both significant and non-significant differences in yield when the peanutworm was controlled. The variation was due to the age of the worms, age of the plants, method of insecticide application, and the time of application. It was reported that when the peanutworm was present with leafspot in an untreated check, the reduction in yield was in a greater proportion than in an untreated check where leafspot was not a problem.

MATERIALS AND METHODS

Field experiments were conducted at the Oklahoma Agricultural Research Station, Perkins, Oklahoma, during the summer of 1968. The peanut entries tested in these experiments included 288 entries from the Oklahoma Agricultural Experiment Station collection of germ plasm. Most entries had been obtained through the United States Department of Agriculture, Agricultural Research Service, New Crops Branch, Southern Regional Plant Introduction Station, Georgia. Most of these entries were the species, *Arachis hypogea* L., and a few *Arachis glabrata* Benth.

Entries not having commercial names will be identified in this paper by the plant introduction numbers (P.I.) and the Oklahoma peanut numbers (P-No.). In a few cases the P.I. number is not unique to one entry because two or more Oklahoma P-No.'s have been assigned to variants of the same plant introduction.

The test insects were field infestations of thrips, composed of 95% or more of the tobacco thrips, *Frankliniella fusca* (Hinds), and field infestations of *Stegasta bosqueella* (Chambers).

The experimental area occupied approximately six and six-tenths acres and was divided into six separate experiments. Their relative positions are shown in Fig. 1.

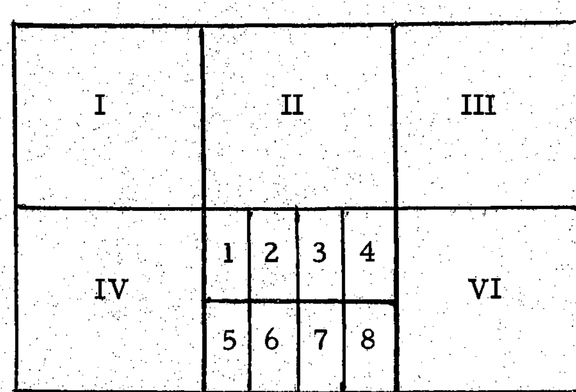

Fig. 1--Relative positions of six experiments. Detail within one experiment shows positions of eight replications.

There are several reasons for not using one large experiment. Soil differences were suspected and soil fertility has influenced damage to peanuts by thrips in previous experiments (Poos et al. 1947). Wind and surrounding crops can influence thrips dispersion (Young 1969). Finally, the time required to evaluate the entire area would be too long to assume uniform conditions of plant maturity, thrips population, and weather.

The statistical design for each experiment was a 7 x 7 balanced lattice of 49 entries with eight replications. The relative position of each replication is shown in Fig. 1. A plot consisted of one row 15 ft. long with approximately 40 plants. The commercial variety, Starr, was present in all experiments as a check.

The plots were separated by 3-ft alleys at the ends of the rows and by a row of "Krinkle" leaf mutant (P-151) between experimental plots. This leaf mutant served as a phenotypic marker to facilitate sampling of the correct plot and to act as a buffer which would tend to produce a uniform thrips population adjacent to each experimental entry.

Thrips Population Evaluation

Thrips counts were made to estimate: 1) population infestation during June 20 - August 22, 2) populations in 1968 to compare to those of previous test years, and 3) populations in the six experiments. Samples from four replications of each experiment were collected and processed in one day. Samples were taken twice weekly, with one day's samples from replications 1 through 4 and the second day's, from 5 through 8.

A sample consisted of 28 foliar buds from 105-feet of "Krinkle" leaf running the length of one replicate in a lattice. Four buds were collected from each of seven plot sized row segments of "Krinkle" leaf on the north side of a randomly selected experimental row. The randomized selection of the row to be sampled was without row number replacement to avoid re-sampling the same row before foliar buds were replaced to be available for sampling.

Each 28-bud sample was placed in a 45-dram plastic vial. The plastic lid was modified with the center removed and replaced by a fine cloth to prevent moisture condensation.

In the laboratory each sample was placed in a 1-gal Berlese funnel and the sample vial, containing 10 drams of 60% alcohol, was attached to the lower end of the funnel with a one-hole rubber stopper. The funnels were heated for one hour with a 60-watt light bulb to drive the thrips into the attached vial. The inside of the funnel and the buds were then washed with a fine mist water spray to carry any remaining thrips into the alcohol solution.

The solution was placed in a filter paper-lined funnel and the vial thoroughly rinsed to remove any adhering thrips. The filter paper was removed and unfolded. A grid was placed over the filter paper and the thrips were counted with the aid of a microscope. A thumb punch tally counter was used to keep an accurate count of adults and larvae.

Damage Rating Scale for Thrips

Leaves were rated on an eight-point scale where "1" indicated no thrips damage and "8" complete leaf destruction. Fig. 2 illustrates the categories for this scale.

Method of Evaluation

Damage was evaluated by rating the most damaged leaf on each of 20 consecutive plants per plot. Thumb-punch tally counters were used to accumulate the twenty leaf ratings and the total number of damage points were recorded for each plot. One week was required for two evaluators to read each of the six experiments.

Fig. 2--Leaf damage ratings, "1" through "8".

Late Season Seedling Evaluation of Thrips

Two experiments were planted in August 1968 to further evaluate some of the entries that had been tested in June and July. These experiments were of the same statistical design as before but the plots were composed of hills instead of rows. "Krinkle" leaf was included as before but also as hills. Hills were spaced 1-yard apart and each contained four seeds. Each experiment occupied approximately one-half acre.

These plots were evaluated in September when they were in the five-leaf stage. Ratings of the most heavily damaged leaf on all plants in each hill were totaled and recorded. This method required one day for one evaluator to take readings on two experiments.

Red-Necked Peanutworm Damage Rating Scale

A heavy infestation of the red-necked peanutworm occurred in late July and throughout August on the original six experiments previously evaluated for thrips damage.

The leaves were rated on a nine-point damage scale where "1" indicated no peanutworm damage and "9", complete destruction of the leaf. A general description of the scale is:

Class 1. No visible signs of feeding
Class 2. Holes in one or two leaflets
Class 3. Holes in three or four leaflets
Class 4. All leaflets with damaged edges
Class 5. One or two leaflets damaged to the mid-vein
Class 6. Three or four leaflets damaged to mid-vein

Class 7. All leaflets with damage to mid-vein and complete destruction of one leaflet
Class 8. All leaflets with damage to mid-vein and complete destruction of two or three leaflets
Class 9. Complete destruction of all leaflets

Method of Evaluation

Each plot was scanned and the damage class that occurred throughout the row-plot was recorded. The general appearance of the complete row determined the class of damage. There was one damage rating value for each plot.

RESULTS AND DISCUSSION

Damage Evaluation of Balanced Lattice Experiments

Germination was poor for a few entries in 8 of the 14 experiments. Eleven entries failed to germinate in three or more of their eight replicates and were eliminated from the tests.

Since there were missing plots in almost every lattice, all experiments were treated as randomized block designs where each lattice was a block.

Damage ratings for all experiments were analyzed as described by Snedecor and Cockran (1967) and adjusted means were compared by use of Duncan's New Multiple Range Test (1955).

Thrips Population Data

Population data were totaled for each day. The daily average number of thrips per bud is shown in Fig. 3. The population level was higher in June and July than it had been the two previous years.

The mean number of thrips per foliar bud in each replication in each experiment and mean number of thrips per foliar bud in each experiment for each day sampled are shown in Table 1. These data show the variation in the thrips population throughout the test area.

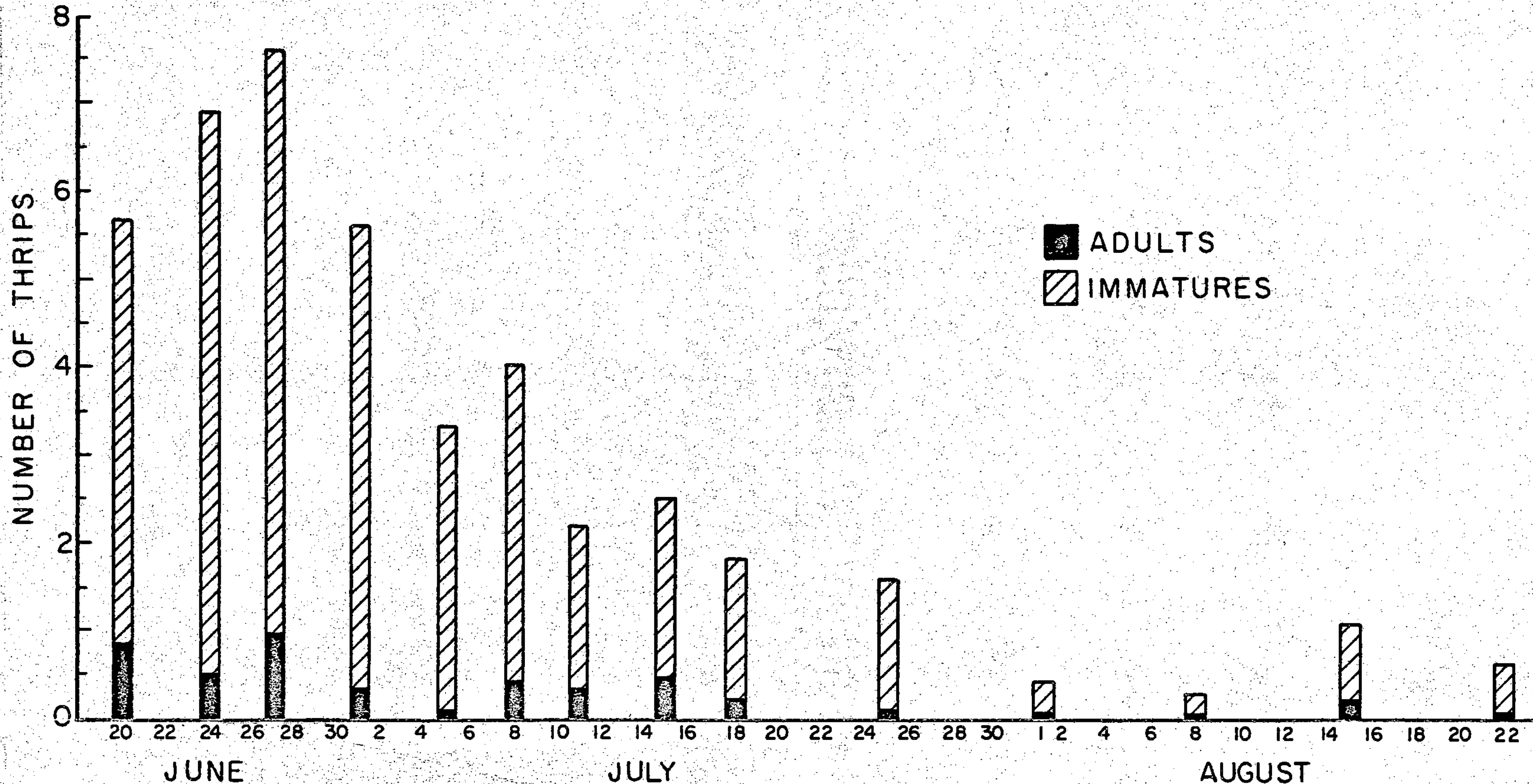

Fig. 3.--Average daily number of thrips per foliar bud, 1968.

Table 1. --Mean number of thrips per foliar bud in each replication sampled within an experiment, and mean number of thrips per foliar bud in each experiment for each day sample.

	Exp. 1	Exp. 2	Exp. 3	Exp. 4	Exp. 5	Exp. 6
June 20, 1968						
Rep. 5	5.50	4.71	3.64	6.32	2.14	4.71
Rep. 6	4.75	6.17	4.00	4.92	2.82	3.10
Rep. 7	7.07	5.50	2.39	8.14	2.46	5.35
Rep. 8	9.89	9.50	2.75	5.50	2.71	5.03
Exp. Mean	6.80	6.47	3.19	6.22	2.53	4.55
June 24, 1968						
Rep. 1	6.46	2.96	5.85	5.17	3.07	3.42
Rep. 2	5.89	4.03	5.35	6.85	4.03	2.60
Rep. 3	11.46	9.28	5.92	7.00	8.10	3.03
Rep. 4	8.89	15.03	7.14	3.82	3.50	3.78
Exp. Mean	8.17	7.83	6.07	5.71	4.67	3.21
June 27, 1968						
Rep. 5	3.28	5.32	7.89	5.35	6.32	10.46
Rep. 6	7.07	6.57	7.00	11.00	5.75	2.35
Rep. 7	8.03	7.75	10.32	14.25	4.32	4.67
Rep. 8	9.14	7.57	5.96	11.32	3.57	8.14
Exp. Mean	6.88	6.00	6.94	9.05	4.16	5.16
July 1, 1968						
Rep. 1	2.53	3.32	5.03	10.39	12.10	5.00
Rep. 2	2.14	6.39	4.60	5.21	6.14	6.10
Rep. 3	1.67	5.85	5.64	8.07	4.71	5.50
Rep. 4	4.96	5.50	4.96	8.46	3.92	5.42
Exp. Mean	2.83	5.26	5.06	8.03	6.72	5.50
July 5, 1968						
Rep. 5	3.32	2.35	4.71	4.03	6.32	3.50
Rep. 6	4.50	2.28	4.42	2.00	4.50	4.67
Rep. 7	7.00	2.89	4.92	2.85	2.28	2.89
Rep. 8	2.82	3.14	4.50	2.21	1.85	3.78
Exp. Mean	4.41	2.66	4.64	2.95	3.74	3.71
July 8, 1968						
Rep. 1	1.89	5.10	4.57	6.00	3.71	3.39
Rep. 2	4.57	4.42	2.71	4.85	4.03	3.03
Rep. 3	4.17	4.78	2.42	4.17	2.42	6.57
Rep. 4	5.21	2.71	2.85	4.17	3.60	6.39
Exp. Mean	3.96	4.25	3.14	4.80	3.44	4.84
July 11, 1968						
Rep. 5	1.85	.92	2.46	2.60	3.25	2.50
Rep. 6	2.39	.96	2.71	2.10	3.71	3.78
Rep. 7	1.85	1.89	3.14	3.78	1.50	2.03
Rep. 8	3.28	3.07	1.64	2.07	.89	2.35
Exp. Mean	2.34	1.71	2.49	2.64	2.33	2.66

Table 1.--(Continued)

	Exp. 1	Exp. 2	Exp. 3	Exp. 4	Exp. 5	Exp. 6
July 15, 1968						
Rep. 1	3.39	2.92	2.71	3.35	3.57	1.32
Rep. 2	3.32	2.28	1.92	2.14	1.92	2.28
Rep. 3	1.57	3.17	1.39	1.28	1.07	1.10
Rep. 4	3.42	5.25	1.39	2.32	1.14	2.21
Exp. Mean	2.92	3.41	1.85	2.27	1.92	1.73
July 18, 1968						
Rep. 5	1.39	1.03	2.67	2.60	2.14	3.21
Rep. 6	3.39	1.21	1.25	1.25	1.28	2.32
Rep. 7	3.50	1.75	2.10	2.78	1.35	1.60
Rep. 8	1.75	1.78	1.39	1.50	.96	.46
Exp. Mean	10.03	5.78	1.85	2.03	1.43	1.90
July 25, 1968						
Rep. 1	3.32	1.75	2.71	2.39	.89	1.42
Rep. 2	2.32	2.25	1.42	1.75	1.14	1.46
Rep. 3	2.10	1.71	1.57	1.42	.75	1.67
Rep. 4	2.03	2.00	1.00	1.14	.57	.85
Exp. Mean	2.44	1.92	1.67	1.67	.83	1.35
August 1, 1968						
Rep. 5	.67	.07	.14	.14	.53	.32
Rep. 6	.32	.28	.10	.14	.64	.32
Rep. 7	.07	.21	.35	.17	.71	.42
Rep. 8	.75	.28	.32	.32	.67	.42
Exp. Mean	.45	.21	.23	.19	.64	.37
August 8, 1968						
Rep. 1	.17	.17	.21	.17	.28	.32
Rep. 2	.07	.39	.17	.14	.21	.60
Rep. 3	.10	.25	.17	.17	.14	.64
Rep. 4	.50	.50	.10	.17	.28	.57
Exp. Mean	.21	.33	.16	.16	.23	.53
August 15, 1968						
Rep. 5	1.39	1.50	1.03	.39	1.21	1.07
Rep. 6	1.96	1.25	.57	.25	.71	1.28
Rep. 7	1.60	.96	.53	.32	1.32	1.14
Rep. 8	1.39	.46	.82	1.35	.75	1.10
Exp. Mean	1.15	1.04	.74	.58	1.00	1.15
August 22, 1968						
Rep. 1	1.71	.78	1.28	.78	.25	.35
Rep. 2	.85	.92	1.07	.53	.35	.14
Rep. 3	.85	.46	.35	1.00	.07	.53
Rep. 4	.50	.21	.25	.57	.07	.39
Exp. Mean	.98	.59	.74	.72	.18	.35

Thrips Damage Evaluation

Coefficients of variation were approximately 12% in all early season experiments and 22% in the late season experiments.

Significant differences ($\underline{p} \leq .05$) were found among entries in all experiments.

The ten least damaged entries in each of the thrips experiments are listed in Tables 2 and 3. The mean damage rating and the number of entries significantly more damaged are shown for each of these entries. The experimental mean, Starr mean, highest mean, and coefficient of variation for each experiment are also given.

Three entries ranked among the top ten in early season experiments and in each of the two late season experiments. Their P.I. numbers were 299468, 314895, and 268771. The latter entry was rated among the top ten of 49 entries in two experiments by Young (1969).

Six entries that had not been tested before by this method ranked among the top ten in their early season experiments and among the top ten in one of the late season experiments. These were P.I. 306223, P.I. 280688, P.I. 246388, P.I. 121070-1, P-4-65-91, and P-326-65-2.

Four entries that had previously ranked among the top ten in experiments by Young (1969) occurred among the top ten in their early season experiment and in one late season experiment. These were P.I. 268791, P.I. 268678, P.I. 268661, and P.I. 259745.

Table 2.--Mean single-leaf thrips damage ratings of top ten peanut entries in each of six experiments.

P.I. No.	Rating	No. ent. more damaged*	P.I. No.	Rating	No. ent. more damaged*
Exp. 1: Exp. $\overline{X}$, 3.905; High 4.681; Starr, 3.681 C.V., 12.4%			Exp. 4: Exp. $\overline{X}$, 4.375; High 5.481; Starr, 3.744; C.V., 14.4%		
259705	2.956	39	268661	3.562	23
T 32-B-1-2	2.995	38	P-4-65-91	3.687	16
298877	3.119	33	P-6-65-27	3.744	13
315631	3.131	33	Star Std.	3.856	13
311264	3.244	29	268678	3.875	9
T 32-A-1-4	3.356	24	295193	3.881	9
259800	3.362	23	311265	3.994	9
221068	3.400	23	268772	4.006	7
248757	3.494	14	295216	4.019	7
268791	3.506	14	297394	4.031	7
Exp. 2: Exp. $\overline{X}$, 4.324; High 5.862; Starr, 3.981; C.V., 11.4%			Exp. 5: Exp. $\overline{X}$, 3.783; High 4.437; Starr, 3.475; C.V., 12.5%		
Valencia Sel.	2.869	47	268769	2.987	39
270804	3.256	44	T 314-3	3.162	23
268725	3.544	35	306223	3.212	21
P-262-65-6	3.669	29	121070-1	3.406	12
T 314-4	3.731	27	162532	3.425	12
296223	3.806	20	290597	3.437	12
Florispan	3.850	17	Star Std.	3.475	10
298875	3.862	16	121070-3	3.494	10
246388	3.906	16	313141	3.500	10
306228	3.944	14	P-262-65-8	3.544	7
Exp. 3: Exp. $\overline{X}$, 4.327; High, 4.981; Starr, 4.100; C.V., 11.3%			Exp. 6: Exp. $\overline{X}$, 3.583; High 4.369; Starr, 3.069; C.V., 12.7%		
268771	3.519	33	P-3-65-119	2.844	31
314895	3.531	33	P-326-65-2	2.881	29
259745	3.619	29	280688	2.919	28
268740	3.819	23	298872	2.925	28
268794	3.844	21	GA 61-42	2.975	27
M 284A2	3.850	21	P-1-62-1	3.069	25
313144	3.881	19	Star Std.	3.156	25
268729	3.962	17	229553	3.175	22
T 314-1	4.000	13	P-587-65-1	3.175	22
P-265-65-45	4.000	13	Tex 20 OICRB 1243	3.175	22

*$P \leq .05$

Table 3.--Mean single-leaf thrips damage ratings of top ten peanut entries for late plant in each of two experiments.

P.I. No.	Rating	No. Ent. more damaged*	P.I. No.	Rating	No. Ent. more damaged*
Exp. 1: Exp. $\overline{X}$, 2.211; High 3.012; Starr, 2.450; C.V., 22.1%			Exp. 2: Exp. $\overline{X}$, 2.744; High 3.375; Starr 2.122; C.V., 21.1%		
299468	1.287	40	268771	1.800	14
P-1-62-1	1.662	17	280688	1.900	10
268661	1.787	11	246388	1.912	10
306223	1.787	11	314895	1.937	10
268771	1.800	11	P-4-65-91	1.950	8
259745	1.800	11	299468	1.975	8
314895	1.862	10	268678	1.975	8
268791	1.925	8	P-326-65-2	1.987	8
P-6-65-20	1.937	8	P-2-62-5	2.000	7
P-4-65-91	1.962	8	121070-1	2.012	7

*$\underline{P} \leq .05$

Eleven entries that had been tested by Young (1969) were ranked among the top ten in their early season experiment. These were P.I. 268769, P.I. 259800, P.I. 270804, P.I. 268729, P.I. 268794, P.I. 268740, P.I. 268725, P.I. 298877, P.I. 268772, P.I. 290597, and P.I. 298872.

Valencia Selection was ranked top in its experiment and was significantly less damaged than 47 other entries in its experiment.

P.I. 259705 was ranked top in its experiment and was significantly less damaged than 39 other entries in its experiment.

P.I. 268769 was ranked top in its experiment and was significantly less damaged than 39 other entries in its experiment. In experiments by Young (1969) it was ranked top in one experiment and seventh from the top in another experiment.

P.I. 268661 and P.I. 280688 were suggested to have a slight degree of resistance by Young (1969). Both were tested in these experiments. P.I. 268661 was ranked top in its early season experiment and third from the least damaged in the late season experiment.

P.I. 280688 was ranked second from the least damaged in the early season experiment and third in the late season experiment.

All entries tested are listed in the appendix, in numerical order according to P.I. numbers within each experiment. Damage ratings from the evaluations are shown (Tables 1 to 8). All nonsignificant ranges are indicated so that significant differences among entries can be determined.

An indication as to the degree of resistance found is presented by comparison with Starr, a commercial variety. In the eight thrips experiments the number of entries having lower damage than Starr were: 15, 11, 15, 3, 6, 6, 35, 18.

Red-Necked Peanutworm Damage Evaluation

Coefficients of variation were approximately 20% in all experiments.

Significant differences ($\underline{p} \leq .05$) were found among entries in all experiments.

The ten least damaged entries in each of the peanutworm experiments are listed in Table 4. The mean damage rating and the number of entries significantly more damaged are shown for each of these entries. The experimental mean, Starr mean, highest mean, and coefficient of variation for each experiment are also given.

P.I. 277197 was top in its experiments and had a mean damage rating of 1.120. This is practically a rating of "no" damage on the rating scale. It had significantly less damage than 45 entries in its experiment.

P.I. 290581 was top in its experiment and had a mean damage rating of 1.750. It had significantly less damage than 41 other entries in its experiment.

P.I. 315631 was top in its experiment and had a mean damage rating of 1.750. It had significantly less damage than 39 other entries in its experiment.

Table 4.--Mean scanned peanutworm leaf damage ratings of top ten entries in each of six experiments.

P.I. No.	Rating	No. ent. more damaged*	P.I. No.	Rating	No. ent. more damaged*
Exp. 1: Exp. $\overline{X}$, 3.073; High, 3.870; Starr, 3.000; C.V., 30.2%			Exp. 4: Exp. $\overline{X}$, 4.408; High, 5.120; Starr, 4.620; C.V., 12.7%		
315631	1.750	39	P-151 Purple	3.000	46
GA 186-28	1.870	32	GA 186-28	3.370	38
T 1135	2.000	24	300586	3.620	29
298851	2.120	16	268661	3.620	29
221068	2.250	8	290599	3.750	26
259705	2.370	6	P-30-1-2 ETC	3.750	26
P-2-62-5	2.500	3	SER 65-15	3.870	23
268708	2.620	1	56 R.	4.000	15
298877	2.620	1	314817	4.000	15
T 32-B-1-2	2.620	1	262094	4.000	15
Exp. 2: Exp. $\overline{X}$, 3.250; High, 4.250; Starr, 3.500; C.V., 24.0%			Exp. 5: Exp. $\overline{X}$, 3.585; High, 4.500; Starr, 4.250; C.V., 22.0%		
290581	1.750	41	277197	1.120	45
P-30-1-2-62-6	2.120	35	290597	1.250	45
162541	2.120	35	306223	1.750	44
F 439-16	2.250	33	290633	2.250	40
300242	2.250	33	314818	2.870	21
GA 119-20	2.370	29	No. 466 Peru	2.870	21
Valencia Sel.	2.500	21	P-25-65-13	3.000	15
Jenkins Jumbo	2.620	16	162532	3.000	15
295223	2.750	9	313183	3.250	3
270804	2.750	5	313142	3.250	3
Exp. 3: Exp. $\overline{X}$, 3.609; High, 4.250; Starr, 3.870; C.V., 16.6%			Exp. 6: Exp. $\overline{X}$, 4.762; High 6.000; Starr, 4.870; C.V., 11.9%		
268859	2.750	36	280688	3.500	40
259820	2.750	36	P-587-65-1	3.750	38
261965	2.870	29	P-326-65-2	3.750	38
P-29-65-90	3.000	17	315633	3.870	36
259647	3.000	17	306222	3.870	36
P-29-65-46	3.000	17	300239	4.120	31
270857	3.000	17	298863	4.120	31
313135	3.000	17	298872	4.120	31
298863R	3.250	4	NC4X-	4.120	31
221708	3.370	2	229553	4.250	29

*$\underline{P} \leq .05$

All entries tested are listed in the appendix, in numerical order according to P.I. number within each experiment. Damage ratings from the evaluations are shown (Tables 9 to 14). All nonsignificant ranges are indicated so that significant differences among entries can be determined.

In the six peanutworm experiments the number of entries having lower damage ratings than Starr were: 16, 32, 38, 32, 44, 29.

SUMMARY

Two hundred eighty-nine peanut entries were tested for resistance to thrips and the red-necked peanutworm by measuring leaf damage. They were tested in six 7 x 7 balanced lattice field experiments.

Random samples of the thrips population were taken from "Krinkle" leaf spreader rows to guage the population density during the growing season. The thrips population level was higher than in the two previous years. Varied population density was also shown to be present during these studies.

Analysis of the thrips leaf damage experiments gave significant differences ($\underline{p} \leq .05$) among entries in all experiments.

Forty-eight entries from the early season thrips tests were re-evaluated in two late season balanced lattice experiments. Some of the entries that were among the least damaged in the early tests reoccurred in the least damaged in the late tests.

A few entries showed a moderate level of thrips resistance. Among these were P.I. 268661, P.I. 259745, P.I. 268771, P.I. 299468, and P.I. 314895. These are all Spanish type peanuts.

In the peanutworm damage evaluation, significant differences ($\underline{p} \leq .05$) were found among entries in all experiments. Entries showing some indication of a moderate level of resistance were: P.I. 177197, P.I. 290581, and P.I. 315631.

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APPENDIX

Table 1. - Mean leaf thrips damage rating of peanut entries in early season - Experiment 1 - 1968.

Entry P.I. Number	Okla. P-No.	$\overline{X}$	Significant $P \leq .05^*$
Starr	0006	3.681	cdefghi
GA C1-27	1258	3.787	defghij
GA 186-28	0972	4.419	klmno
Manz Pintar II	0935	3.537	abcdefg
P-2-62-5	1006	3.725	efghi
P-4-65-25	1939	3.819	defghijk
T 1135	0962	4.500	klmno
T 32-A-1-4	0186	3.356	abcde
T 32-B-1-2	0216	2.995	ab
Valencia Selection	0907	4.019	ghijklmn
121070-3	0118	4.031	ghijklmn
121070-3	0119	3.762	defghij
162538	0198	3.619	cdefg
221068	0991	3.400	abcdefg
248757	0546	3.494	abcdefg
259705	0778	2.956	a
257800	0332	3.362	abcdef
261895	0508	3.887	efghijk
262038	0491	4.050	ghijklmno
262100	0540	3.956	fghijklm
268708	0629	4.231	ijklmno
268770	0695	3.612	cdefg
268791	0706	3.506	abcdefg
268804	0723	3.631	cdefgh
268813	0880	4.419	klmno
294647	1148	4.412	klmno
295190	1015	4.012	ghijklmn
298851	1190	4.031	ghijklmn
298877	1211	3.119	abc
299470	1213	3.594	abcdefg
311264	1031	3.244	abcd
313119	1034	3.844	efghijk
313131	1044	4.244	ijklmno
313132	1045	3.862	efghijk
313134	1047	4.225	hijklmno

Table 1. (Continued)

Entry P.I. Number	Okla. P-No.	$\overline{X}$	Significant $P \leq .05$*
313137	1050	4.012	ghijklmn
313143	1056	4.344	jklmno
313151	1063	4.419	klmno
313157	1065	4.356	klmno
313172S	1078	4.681	o
313180	1085	4.537	no
313193	1097	4.337	jklmno
313195	1099	4.556	no
313199	1101	4.275	ijklmno
313201	1105	3.919	ijkl
313204	1108	4.337	jklmno
314048	1109	3.906	efghijkl
314980	1116	4.225	hijklmno
315631	1124	3.131	abc

* Means not followed by the same letter are significantly different.

Table 2. - Mean leaf thrips damage rating of peanut entries in early season - Experiment 2 - 1968.

Entry P.I. Number	Okla. P-No.	$\overline{X}$	Significant $P \leq .05^*$
Starr	0006	3.981	cdefghijk
F 439-16	1260	4.575	klmnopq
Florispan	0939	3.850	cdefgh
GA 119-20	1262	4.419	fghijklmnop
Jenkins Jumbo	0961	5.862	r
OAEP - 58-29	0083	4.194	defghijklm
P-2-62-15	1005	4.262	defghijklmn
P-4-65-29	1440	4.050	cdefghijkl
P-6-65-20	1443	4.037	cdefghijkl
P-6-65-28	1442	4.194	defghijklm
P-30-1-2-62-6	1446	3.944	cdefghijk
P-262-65-6	1001	3.669	bcde
P-292-65-12	1448	4.587	klmnopq
T-314-4	0008	3.731	bcde
Valencia Selection	0925	2.869	a
162541	0154	4.650	lmnopq
246388	1126	3.862	cdefgh
268649	0376	5.118	qr
268725	0648	3.544	bc
268763	0680	4.475	hijklmnop
270767	0882	4.406	fghijklmnop
270804	0462	3.256	ab
290581	0944	4.287	efghijklmn
290617	1292	4.425	ghijklmnop
294653	1154	4.775	mnopqr
295171	1012	4.350	fghijklmno
295192	1017	4.494	ijklmnop
295223	1520	3.806	cdef
295731	1317	4.869	nopqr
295738	1318	4.744	mnopq
298875	1325	3.862	cdefgh
300242	1217	5.312	r
306228	1028	3.906	cdefghij
313118	1033	4.356	fghijklmno
313120	1035	4.375	fghijklmnop

Table 2. (Continued)

Entry P.I. Number	Okla. P-No.	$\overline{X}$	Significant $P \leq .05$*
313123	1038	4.356	fghijklmno
313124	1039	4.200	defghijklm
313139	1052	4.250	defghijklm
313146	1060	4.444	ghijklmnop
313168	1072	4.631	lmnopq
313176	1081	4.919	opqr
313177	1082	4.287	efghijklmn
313179	1084	4.412	fghijklmnop
313191S	1095	4.481	ijklmnop
313202	1106	4.437	ghijklmnop
313203	1107	4.556	jklmnopq
314048	1110	4.269	defghijklmn
314894	1112	4.562	klmnopq
314897	1115	4.987	pqr

* Means not followed by the same letter are significantly different.

Table 3. - Mean leaf thrips damage rating of peanut entries in early season - Experiment 3 - 1968.

Entry P.I. Number	Okla. P-No.	$\overline{X}$	Significant $P \leq .05^*$
Starr	0006	4.100	abcdefghi
C 32 S	1259	4.000	abcdefg
M - 284 A 2	0956	3.850	abcd
OAEP - 58 - 16	0074	4.350	cdefghijkl
OAEP - 58 - 22	0080	4.037	abcdefgh
P-3-65-15	1436	4.206	bcdefghijk
P-29-65-40	1450	4.212	bcdefghijk
P-29-65-46	1451	4.150	bcdefghij
P-265-65-45	0998	4.000	abcdefg
T 314 - 1	0010	4.000	abcdefg
121070-3	0115	4.431	defghijklm
152125	0330	4.981	m
155053	0973	4.787	klm
221708	0912	4.625	hijklm
259591	0775	4.669	ijklm
259594	0311	4.075	abcdefghi
259647	1303	4.831	lm
259675	0314	4.637	hijklm
259795	0779	3.531	ab
259820	1266	4.775	klm
261965	0539	4.469	efghijklm
268633	0844	4.812	lm
268729	0652	3.962	abcdef
268734	0656	4.069	abcdefghi
268740	0418	3.819	abc
268771	0429	3.519	a
268794	0711	3.844	abcd
268859	1305	4.450	defghijklm
270857	0772	4.094	abcdefghi
285169	1011	4.537	fghijklm
292279	1290	4.612	ghijklm
295174	1014	4.599	ghijklm
298863R	1023	4.200	bcdefghijk
313126	1041	4.675	jklm
313128	1043	4.400	cdefghijklm

Table 3. (Continued)

Entry P.I. Number	Okla. P-No.	$\overline{X}$	Significant $P \leq .05$*
313133	1046	4.712	jklm
313135	1048	4.349	cdefghijkl
313136	1049	4.556	fghijklm
313144	1058	3.881	abcde
313145	1059	4.594	ghijklm
313159	1067	4.412	efghijklm
313178	1083	4.919	lm
313190	1093	4.419	cdefghijklm
313191	1094	4.344	cdefghijkl
313196	1100	4.669	ijklm
313200	1102	4.337	cdefghijkl
314895	1113	3.531	a
315632	119	4.581	ghijklm

* Means not followed by the same letter are significantly different.

Table 4. - Mean leaf thrips damage rating of peanut entries in early season - Experiment 4 - 1968.

Entry P.I. Number	Okla. P-No.	$\overline{X}$	Significant $P \leq .05^*$
Starr	0006	3.744	abc
F 393 - 7	1261	5.450	j
Floridia 393	0960	5.100	ij
GA 186-28	1263	5.481	j
P-4-65-91	1441	3.687	ab
P-6-65-27	1444	3.744	abc
P-30-1-2-Etc.	1445	4.450	bcdefgh
P-74-65-3	1002	4.212	abcdefg
P-114-60-1	0185	4.487	cdefgh
P-151-Purple	0291	4.294	abcdefg
P-262-65-33	0993	4.394	bcdefgh
SER 65-15	1269	4.906	ghij
V-1 Red	0986	4.381	bcdefgh
Virginia Bunch	0959	5.350	ij
56 R	1265	4.825	fghij
259591	0293	4.581	defgh
259599	0313	4.531	cdefgh
262094	1280	4.331	abcdefgh
268644	0372	4.294	abcdefg
268661	0971	3.562	a
268678	0610	3.856	abcd
268764	0681	4.087	abcdef
268772	0688	3.994	abcde
288161	1308	4.294	abcdefg
290599	0949	4.625	defgh
291983	1144	4.031	abcde
292278	1293	4.437	bcdefgh
294654	1010	4.306	abcdefg
295193	1018	3.875	abcd
295216	1311	4.006	abcde
295746	1319	4.625	defgh
295752	1022	4.044	abcdef
297394	1323	4.019	abcde
297395	1324	4.044	abcdef
298828	1169	4.881	ghij

Table 4. (Continued)

Entry P.I. Number	Okla. P-No.	$\overline{X}$	Significant $P \leq .05$*
299470	0968	4.300	abcdefg
300586	1223	4.275	abcdefg
300586 R2	1025	4.214	abcdefg
300587	1224	4.775	efghij
300595	1232	4.319	abcdefg
305217	1027	4.419	bcdefgh
311265	1032	3.881	abcd
313150	1062	4.525	cdefgh
313158	1066	4.275	abcdefg
313171	1075	4.550	defgh
313185	1090	4.406	bcdefgh
313188	1091	4.700	efghi
314817	1111	4.462	bcdefgh

*Means not followed by the same letter are significantly different.

Table 5. - Mean leaf thrips damage rating of peanut entries in early season - Experiment 5 - 1968.

Entry P.I. Number	Okla. P-No.	$\overline{X}$	Significant P ≤ .05*
Starr	0006	3.475	abcde
G 233	0957	3.569	bcdefgh
No. 466 Peru	0936	4.137	ghijkl
P-3-65-50	1437	3.581	bcdefgh
P-16-1 White	0292	4.062	efghijkl
P-25-65-13	1449	3.987	defghijkl
P-74-66-B	1277	3.612	bcdefgh
P-262-65-8	0994	3.544	bcdefg
T-314-3	0007	3.162	ab
121070-1	0109	3.406	abcd
121070-1	0106	3.587	bcdefgh
121070-3	0117	3.494	abcdef
145045	0979	4.437	l
162532	0153	3.425	abcd
268702	0623	3.987	defghijkl
268767A	0932	3.662	bcdefghi
268769	0428	2.987	a
277197	0942	3.656	bcdefghi
288106	1307	4.237	ijkl
290597	0947	3.437	abcd
290633	0953	3.862	defghijkl
292280	1291A	3.644	bcdefgh
294652	1009	4.319	jkl
295241	1313	3.712	bcdefghi
295258	1315	3.850	defghijkl
298856	1194	4.156	hijkl
298877	1209	3.575	bcdefgh
300570	1026	3.612	bcdefgh
306223	1238	3.212	abc
311263	1030	3.706	bcdefghi
313125	1040	3.806	defghijk
313138	1051	3.762	cdefghij
313141	1054	3.500	bcdef
313142	1055	3.625	bcdefgh
313149	1061	3.994	defghijkl

Table 5. (Continued)

Entry P.I. Number	Okla. P-No.	$\overline{X}$	Significant $P \leq .05$*
313162-S	1071	3.969	defghijkl
313173	1079	4.237	ijkl
313175	1080	3.906	defghijkl
313182	1087	4.075	fghijkl
313183	1088	4.350	kl
313189	1092	3.625	bcdefgh
313192	1096	4.319	jkl
313200	1104	3.787	cdefghijk
314818	1123	3.750	cdefghij
314896	1114	4.087	fghijkl
315625	1117	4.056	efghijkl
315630	1118	3.637	bcdefgh
315635	1120	4.000	defghijkl

* Means not followed by the same letter are significantly different.

Table 6. - Mean leaf thrips damage rating of peanut entries in early season - Experiment 6 - 1968.

Entry P.I. Number	Okla. P-No.	$\overline{X}$	Significant $P \leq .05$*
Starr	0006	3.069	abcde
F 1097	0963	3.987	mnopqr
GA-61-42	1273	2.975	abcd
NC 4X	0204	3.287	abcdefgh
P-1-62-1	0327	3.069	abcde
P-3-65-119	1438	2.844	a
P-74-65-5	1003	3.584	efghijklmnopq
P-262-65-34	0995	3.450	cdefghijklmn
P-292-65-11	1447	3.806	ghijklmnopq
P-326-65-2	1287	2.881	ab
P-587-65-1	1284	3.175	abcdef
Texas 20 OICRB 1243	0085	3.175	abcdef
121070-3	0114	3.437	bcdefghijklm
229553	0025	3.156	abcdef
261959	0812	4.069	pqr
262000	0810	4.169	qr
262098	0821	3.606	efghijklmnopq
263395	0893	3.994	mnopqr
268682	0862	3.900	jklmnopqr
268711	0407	3.344	abcdefghij
268741	0663	3.362	abcdefghijk
268767	0334	3.637	fghijklmnopq
268767	0599	3.769	ghijklmnopq
268770	0686	3.487	defghijklmno
274203	0515	3.806	ghijklmnopq
280688	0326	2.919	abc
295173	1013	3.750	ghijklmnopq
295215	1020	4.369	r
295235	1312	3.694	fghijklmnopq
295243	1314	3.175	abcdefg
298863	1200	3.431	bcdefghijklm
298872	1205	2.925	abc
300239	1215	3.319	abcdefghi
306222	1445A	3.762	ghijklmnopq
311266	1127	3.325	abcdefghi

Table 6. (Continued)

Entry P.I. Number	Okla. P-No.	$\overline{X}$	Significant $P \leq .05$*
313122	1037	3.956	mnopqr
313127	1042	3.775	ghijklmnopq
313140	1053	3.381	abcdefghijk
313156	1064	3.856	ijklmnopqr
313160	1068	4.031	opqr
313161	1069	3.944	lmnopqr
313162	1070	3.894	jklmnopqr
313172	1077	4.006	nopqr
313181	1086	4.094	pqr
313184	1089	3.912	klmnopqr
313194	1098	3.644	fghijklmnopq
313435	1057	4.044	pqr
315633	1125	3.394	abcdefghijkl
315637	1121	3.844	hijklmnopqr

* Means not followed by the same letter are significantly different.

Table 7. - Mean leaf thrips damage rating of peanut entries in late season - Experiment 1 - 1968.

Entry P.I. Number	Okla. P-No.	$\overline{X}$	Significant P ≤ .05*
Starr	0006	2.450	defghijk
Florispan	0939	2.375	cdefghij
Jenkins Jumbo	0961	2.875	ijk
P-1-62-1	0327	1.662	ab
P-2-62-5	1006	2.125	bcdefg
P-3-65-119	1438	2.187	bcdefg
P-4-65-91	1441	1.962	bcde
P-6-65-20	1443	1.937	bcde
P-6-65-27	1444	2.400	cdefghij
P-29-65-13	1449	2.125	bcdefg
P-30-1-2-32-62-6	1446	2.512	efghijk
P-326-65-2	1287	1.975	bcdef
P-587-65-1	1284	2.225	bcdefh
229553	0025	2.112	bcdefg
246388	1126	2.075	bcdefg
T-32-A-1-4	0186	2.012	bcdefg
121070-1	0109	2.225	bcdefgh
121070-3	0117	2.037	bcdefg
152125	0330	2.925	jk
259599	0313	2.837	ijk
259745	0779	1.800	abc
262000	0810	2.800	hijk
268661	0971	1.787	abc
268678	0610	2.387	cdefghij
268725	0648	2.287	cdefghi
268729	0652	2.125	bcdefg
268740	0418	2.150	bcdefg
268769	0428	2.000	bcdef
268771	0429	1.800	abc
268772	0688	2.137	bcdefg
268777	0695	2.287	cdefghi
268791	0706	1.925	bcde
268794	0711	2.125	bcdefg
268804	0723	2.100	bcdefg
270804	0462	2.050	bcdefg

Table 7. (Continued)

Entry P.I. Number	Okla. P-No.	$\overline{X}$	Significant $P \leq .05$*
290597	0947	2.150	bcdefg
298872	1205	2.100	bcdefg
299468	1211	1.287	a
299470	1213	2.625	ghijk
306223	1238	1.787	abc
311265	1032	2.337	cdefghij
313144	1058	2.587	fghijk
313183	1088	2.625	ghijk
313195	1099	3.012	k
314895	1113	1.862	bcd
318673	1263	2.537	efghijk

* Means not followed by the same letter are significantly different.

Table 8. - Mean leaf thrips damage rating of peanut entries in late season - Experiment 2 - 1968.

Entry P.I. Number	Okla. P-No.	$\overline{X}$	Significant $P \leq .05^{*}$
Starr	0006	2.112	abcdef
Florispan	0939	2.125	abcdefg
Jenkins Jumbo	0961	2.975	jk
P-1-62-1	0327	2.850	ij
P-2-62-5	1006	2.000	abcd
P-3-65-119	1438	2.262	abcdefgh
P-4-65-91	1441	1.950	abc
P-6-65-20	1443	2.300	abcdefghi
P-6-65-27	1444	2.025	abcd
P-29-65-13	1449	2.100	abcdef
P-30-1-7-32-62-6	1446	2.350	abcdefghi
P-326-65-2	1287	1.987	abc
P-587-65-1	1284	2.425	bcdefghij
T-32-A-1-4	0186	2.125	abcdefg
121070-1	0109	2.012	abcd
121070-3	0117	2.012	abcd
152125	0330	2.600	defghij
152125	0330	3.375	k
229553	0025	2.325	abcdefghi
246388	1126	1.912	ab
259745	0779	2.100	abcdef
262000	0810	2.712	ghij
268661	0971	2.087	abcde
268678	0610	1.975	abc
268725	0648	2.225	abcdefgh
268729	0652	2.162	abcdefg
268740	0418	2.137	abcdefg
268769	0428	2.062	abcd
268771	0429	1.800	a
268772	0688	2.437	bcdefghij
268777	0695	2.062	abcd
268791	0706	2.550	cdefghij
268794	0711	2.150	abcdefg
268804	0723	2.112	abcdef
270804	0462	2.187	abcdefgh

Table 8. (Continued)

Entry P.I. Number	Okla. P-No.	$\overline{X}$	Significant $P \leq .05$*
280688	0326	1.900	ab
290597	0947	2.450	bcdefghij
299468	1211	1.975	abc
299470	1213	2.687	fghij
311265	1032	2.325	abcdefghi
313144	1058	2.500	bc defghij
313183	1088	2.762	hij
313195	1099	2.675	efghij
314895	1113	1.937	ab
318673	1263	2.550	cdefghij

* Means not followed by the same letter are significantly different.

Table 9. - Mean leaf red-necked peanutworm damage rating of peanut entries in Experiment 1 - 1968.

Entry P.I. Number	Okla. P-No.	$\overline{X}$	Significant $P \leq .05^{*}$
Starr	0006	3.000	bcdefghi
GA Cl - 27	1258	2.870	bcdefghi
GA 186 -28	0972	1.870	ab
Mani Pintar II	0935	3.120	cdefghi
P-2-62-5	1006	2.500	abcdefg
P-4-65-25	1439	3.250	defghi
T 1135	0962	2.000	abc
T 32-A-1-4	0185	3.370	efghi
T 32-B-1-2	0216	2.620	abcdefgh
Valencia Selection	0907	3.620	ghi
121070-3	0118	3.120	cdefghi
121070-3	0119	3.620	ghi
162538	0198	2.870	bcdefghi
221068	0991	2.250	abcde
248757	0546	3.870	i
259705	0778	2.370	abcdefg
259800	0332	3.120	cdefghi
261895	0508	3.500	fghi
262038	0491	3.370	efghi
262100	0540	3.000	bcdefghi
268708	0629	2.620	abcdefgh
268770	0695	3.750	hi
268791	0706	3.770	efghi
268804	0723	3.750	hi
268813	0880	3.120	cdefghi
294647	1148	3.120	cdefghij
295190	1015	3.250	defghi
298851	1190	2.120	abcd
298877	1211	2.620	abcdefgh
299470	1213	3.370	efghi
311264	1031	3.250	defghi
313119	1034	2.870	bcdefghi
313131	1044	3.370	efghi
313132	1045	3.120	cdefghi
313134	1047	3.250	defghi

Table 9. (Continued)

Entry P.I. Number	Okla. P-No.	$\overline{X}$	Significant $P \leq .05^*$
313137	1050	3.000	bcdefghi
313143	1056	3.250	defghi
313151	1063	3.370	efghi
313157	1065	3.250	defghi
313172S	1078	3.370	efghi
313180	1085	3.370	efghi
313193	1097	3.000	bcdefghi
313195	1099	3.620	ghi
313199	1101	3.250	defghi
313201	1105	3.250	defghi
313204	1108	3.500	fghi
314048	1109	3.120	cdefghi
314980	1116	3.120	cdefghi
315631	1124	1.750	a

* Means not followed by the same letter are significantly different.

Table 10. - Mean leaf red-necked peanutworm damage rating of peanut entries in Experiment 2 - 1968.

Entry P.I. Number	Okla. P-No.	$\overline{X}$	Significant $P \leq .05^*$
Starr	006	3.500	fghijk
F 439-16	1260	2.254	abc
Florispan	0939	3.500	fghijk
GS - 119 - 20	1262	2.370	abcd
Jenkins Jumbo	0961	2.620	abcdef
OAEP 58-29	0083	3.620	ghijk
P-4-65-29	1440	3.370	efghijk
P-6-65-20	1443	3.500	fghijk
P-6-65-20	1443	4.250	k
P-6-65-28	1442	3.870	ijk
P-30-1-2-62-6	1446	2.120	ab
P-262-65-6	1001	3.620	ghijk
P-292-65-12	1148	3.370	efghijk
T 314-4	008	3.370	efghijk
Valencia Selection	0925	2.500	abcde
162541	0154	2.120	ab
246388	1126	3.500	fghijk
268649	0376	3.620	ghijk
268725	0648	3.620	ghijk
268763	0680	3.000	bcdefghi
270767	0882	3.120	cdefghij
270804	0462	2.750	bcdefg
290581	0944	1.750	a
290617	1292	3.750	hijk
294653	1154	3.370	efghijk
295171	1012	3.620	ghijk
295192	1017	2.870	bcdefgh
295223	1520	2.750	bcdefg
295731	1317	3.750	hijk
295738	1318	3.250	defghij
298875	1325	3.750	hijk
300242	1217	2.250	abc
306228	1028	2.870	bcdefgh
313118	1033	3.250	defghij
313120	1035	3.620	ghijk

Table 10. (Continued)

Entry P.I. Number	Okla. P-No.	$\overline{X}$	Significant $P \leq .05$*
313123	1038	3.500	fghijk
313124	1039	3.250	defghij
313139	1052	4.000	jk
313146	1060	3.750	hijk
313168	1072	3.370	efghijk
313176	1081	3.120	cdefghij
313177	1082	3.870	ijk
313179	1084	3.000	bcdefghi
313191S	1095	3.250	defghij
313202	1106	3.370	efghijk
313203	1107	3.370	efghijk
314048	1110	3.870	ijk
314894	1112	3.370	efghijk
314897	1115	3.620	ghijk

* Means not followed by the same letter are significantly different.

Table 11. - Mean leaf red-necked peanutworm damage rating of peanut entries in Experiment 3 - 1968.

Entry P.I. Number	Okla. P-No.	$\overline{X}$	Significant $P \leq .05^*$
Starr	0006	3.870	def
C 32 S	1259	3.620	cdef
M 284 AZ	0956	3.500	bcdef
OAEP-58-16	0074	4.250	f
OAEP-58-22	0080	3.620	cdef
P-265-65-45	0998	3.870	def
P-29-65-40	1450	3.000	abc
P-29-65-46	1451	3.000	abc
P-3-65-15	1436	3.870	def
T 314-1	0010	3.500	bcdef
121070-3	0115	4.000	def
152125	0330	4.120	ef
155053	0973	3.870	def
221708	0912	3.370	abcde
259591	0775	4.120	ef
259594	0311	3.620	cdef
259647	1303	3.000	abc
259675	0314	3.750	cdef
259745	0779	3.500	bcdef
259820	1266	2.750	a
261965	0539	2.870	ab
268633	0844	3.870	def
268729	0652	4.000	def
268734	0656	3.500	bcdef
268740	0418	4.000	def
268771	0429	3.620	cdef
268794	0711	3.870	def
268859	1305	2.750	a
270857	0772	3.000	abc
285169	1011	3.500	bcdef
292279	1290	3.620	cdef
295174	1014	3.750	cdef
298863R	1023	3.250	abcd
313126	1041	3.370	abcde
313128	1043	3.750	cdef

Table 11. (Continued)

Entry P.I. Number	Okla. P-No.	$\overline{X}$	Significant $P \leq .05$*
313133	1046	4.000	def
313135	1048	3.000	abc
313136	1049	3.620	cdef
313144	1058	3.500	bcdef
313145	1059	3.750	cdef
313159	1067	3.870	def
313178	1083	3.870	def
313190	1093	3.500	bcdef
313191	1094	3.370	abcde
313196	1100	4.000	def
313200	1102	4.250	f
314895	1113	3.750	cdef
315632	1119	3.750	cdef

* Means not followed by the same letter are significantly different.

Table 12. - Mean leaf red-necked peanutworm damage rating of peanut entries in Experiment 4 - 1968

Entry P.I. Number	Okla. P-No.	$\overline{X}$	Significant $P \leq .05$*
Starr	0006	4.620	fghij
Florida 393	0960	4.620	fghij
F 393 - 7	1261	4.750	ghij
GA 186 - 28	1263	3.370	ab
P-4-65-91	1441	4.120	cdefg
P-6-65-27	1444	4.620	fghij
P-24-65-3	1002	4.870	hij
P-30-1-2 Etc.	1445	3.750	bcd
P-114-60-1	0185	4.120	cdefg
P-151 Purple	0291	3.000	a
P-262-65-33	0993	4.250	cdefgh
SER 65-15	1264	3.870	bcde
V-1 Red	0986	4.870	hij
Virgin Bunch	0959	4.370	defghi
56 R	1265	4.000	bcdef
259591	0293	5.000	ij
259599	0313	4.750	ghij
262094	1280	4.000	bcdef
268644	0372	4.750	ghij
268661	0971	3.620	bc
268678	0610	4.620	fghij
268764	0681	4.870	hij
268772	0688	4.500	efghij
288161	1308	5.120	j
290599	0949	3.750	bcd
291983	1144	4.870	hij
292278	1293	4.250	cdefgh
294654	1010	4.620	fghij
295193	1018	4.370	defghij
295216	1311	4.750	ghij
295746	1319	4.750	ghij
295752	1022	5.000	ij
297394	1323	4.120	cdefg
297395	1324	4.250	cdefgh
298828	1169	5.120	j

Table 12. (Continued)

Entry P.I. Number	Okla. P-No.	$\overline{X}$	Significant $P \leq .05^{*}$
299470	0968	4.250	cdefgh
300586	1223	3.620	bc
300586 R2	1025	4.620	fghij
300587	1224	4.500	efghij
300595	1232	4.250	cdefgh
305217	1027	4.370	defghi
311265	1032	4.120	cdefg
313150	1062	4.500	efghij
313158	1066	4.870	hij
313171	1075	4.620	fghij
313185	1090	4.620	fghij
313188	1091	4.870	hij
314817	1111	4.000	bcdef

* Means not followed by the same letter are significantly different.

Table 13. - Mean leaf red-necked peanutworm damage rating of peanut entries in Experiment 5 - 1968

Entry P.I. Number	Okla. P-No.	$\overline{X}$	Significant $P \leq .05^{*}$
Starr	0006	4.250	fgh
G 233	0957	3.870	efgh
No. 466 Peru	0936	2.870	cd
P-3-65-50	1437	3.620	defgh
P-16-1 White	0292	3.750	defgh
P-25-65-13	1449	3.000	cde
P-74-66-B	1277	4.500	h
P-262-65-8	0994	3.870	efgh
T - 314 - 3	0007	4.120	fgh
121070-1	0106	4.370	gh
121070-1	0109	3.750	defgh
121070-3	0117	4.000	fgh
145045	0979	3.870	efgh
162532	0153	3.000	cde
268702	0623	4.120	fgh
268767 A	0932	4.120	fgh
268769	0428	3.500	defgh
277197	0942	1.120	a
288106	1307	4.120	fgh
290597	0947	1.250	a
290633	0953	2.250	bc
292280	1291A	3.500	defgh
294652	1009	4.250	fgh
295241	1313	3.500	defgh
295258	1315	3.620	defgh
298856	1194	3.500	defgh
298877	1209	4.250	fgh
300570	1026	4.120	fgh
306223	1238	1.750	ab
311263	1030	4.120	fgh
313125	1040	3.620	defgh
313138	1051	4.000	fgh
313141	1054	3.620	defgh
313142	1055	3.250	def
313149	1061	3.750	defgh

Table 13. (Continued)

Entry P.I. Number	Okla. P-No.	$\overline{X}$	Significant $P \leq .05$*
313162 S	1071	3.500	defgh
313173	1079	4.370	gh
313175	1080	3.750	defgh
313182	1087	4.000	fgh
313183	1088	3.250	def
313189	1092	3.870	efgh
313192	1096	3.750	defgh
313200	1104	3.370	defg
314818	1123	2.870	cd
314896	1114	3.750	defgh
315625	1117	3.870	efgh
315630	1118	3.620	defgh
315635	1120	3.870	efgh

* Means not followed by the same letter are significantly different.

Table 14. - Mean leaf red-necked peanutworm damage rating of peanut entries in Experiment 6 - 1968.

Entry P.I. Number	Okla. P-No.	$\overline{X}$	Significant $P \leq .05^{*}$
Starr	0006	4.870	efghij
F 1097	0963	4.500	cdefg
GA 61 - 44	1273	4.370	bcdef
NC 4X	0204	4.120	abcd
P-1-62-1	0327	4.750	defghi
P-3-65-119	1438	5.000	fghij
P-74-65-5	1003	5.370	ij
P-262-65-34	0995	4.870	efghij
P-292-65-11	1447	4.870	efghij
P-326-65-2	1287	3.750	ab
P-587-65-1	1284	3.750	ab
Texas OICRB-1243	0085	5.000	fghij
121070-3	0114	4.870	efghij
229553	0025	4.250	bcde
261959	0812	5.250	hij
262000	0810	5.250	hij
262098	0821	4.750	defghi
263395	0893	4.750	defghi
268682	0862	5.120	ghij
268711	0407	4.870	efghij
268741	0663	5.000	fghij
268767	0334	5.000	fghij
268767	0599	5.000	fghij
268770	0686	4.870	efghij
274203	0515	6.000	k
280688	0326	3.500	a
295173	1013	4.870	efghij
295215	1020	5.500	jk
295235	1312	5.250	hij
295243	1314	4.750	defghi
298863	1200	4.120	abcd
298872	1205	4.120	abcd
300239	1215	4.120	abcd
306222	1445A	3.870	abc
311266	1127	4.620	defgh

Table 14. (Continued)

Entry P.I. Number	Okla. P-No.	$\overline{X}$	Significant $P \leq .05$*
313122	1037	5.000	fghij
313127	1042	4.870	efghij
313140	1053	4.870	efghij
313156	1064	4.870	efghij
313160	1068	5.120	ghij
313161	1069	5.120	ghij
313162	1070	5.120	ghij
313172	1077	4.500	cdefg
313181	1086	5.000	fghij
313184	1089	5.120	ghij
313194	1098	4.870	efghij
313435	1057	4.870	efghij
315633	1125	3.870	abc
315637	1121	5.120	ghij

* Means not followed by the same letter are significantly different.

VITA 2

John Terry Pitts

Candidate for the Degree of

Master of Science

Thesis: GENETIC RESISTANCE OF PEANUTS TO THE TOBACCO THRIPS, FRANKLINIELLA FUSCA, AND THE RED-NECKED PEANUTWORM, STEGASTA BOSQUEELLA

Major Field: Entomology

Biographical:

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